

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 11529pct dp:jj:df	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).	
International Application No. PCT/AU2003/001132	International Filing Date (day/month/year) 3 September 2003	Priority Date (day/month/year) 25 October 2002
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ A62B 1/10		
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1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 6 sheet(s).

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 22 April 2004	Date of completion of the report 18 February 2005
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer ZBIGNIEW BIELAWSKI Telephone No. (02) 6283 2218

I. Basis of the report**1. With regard to the elements of the international application:***

- ☐ the international application as originally filed.
- ☒ the description, pages **1, 5-12**, as originally filed,
pages , filed with the demand,
pages **2-4**, received on **3 February 2005** with the letter of **2 February 2005**
- ☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages **13-15**, received on **3 February 2005** with the letter of **2 February 2005**
- ☒ the drawings, pages **1/15-15/15**, as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims 1-14	YES
	Claims	NO
Inventive step (IS)	Claims 1-14	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-14	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)**Novelty (N) and Inventive Step (IS)**

Claims 1-14 meet the criteria set forth in PCT Article 33(2) for novelty. The prior art published before the priority date does not disclose an escape device wherein a brake drum spinner frame (a pivotable brake pad holder) is pivotably connected to a plurality of engagement surfaces (braking pads) and wherein the total area of the engagement surfaces increases as the speed of rotation of the spinner frame increases.

Therefore the subject matter of these claims is new and meets the requirements of Article 33(2) PCT with regard to novelty.

The claimed invention is not obvious in the light of any of the cited documents nor is it disclosed in any obvious combination of them. It is also considered that it would not be obvious to a person skilled in the art in the light of common general knowledge either by itself or in combination with any of these documents.

Therefore the subject matter of these claims is not obvious and meets the requirements of Article 33(3) PCT with regard to inventive step.

construction of the devices may be such that they would conceivably be very bulky if constructed for use in higher buildings, or the heat generated during their use would make them impractical. For this reason existing portable escape and descent devices are perhaps providing illusory reassurance to their owners.

- 5 It is to this situation that the present invention is addressed. A portable escape device is provided that allows the user to travel many floor levels.

SUMMARY OF THE INVENTION

Therefore, according to a first aspect of the invention there is provided an escape device characterized in that it includes:

- 10 - a cable;
- a rotatable cable dispensing assembly from which said cable is dispensed under load,
- a braking mechanism operatively connected to said rotatable cable dispensing assembly, said braking mechanism characterised by a brake drum and a brake drum spinner frame, said brake drum spinner frame is pivotably connected to a plurality of
15 engagement surfaces, wherein at least a portion of said engagement surfaces are in contact with said brake drum at all times and at least some braking force is applied when said escape device is at rest;
- whereby the pressure applied by said engagement surfaces on the brake drum and the total area of each engagement surface in contact the brake drum increases as the
20 rotation of said brake drum spinner frame increases, wherein a braking response of the braking mechanism is proportional to the rate at which cable is dispensed from the rotatable cable dispensing assembly.

By producing a braking effect responsive to the speed of the device it is possible to have a regulated a smoother descent.

- 25 Preferably, the cable dispensing assembly and the braking mechanism are located in an outer housing.

Usefully, a housing will also include cooling leaf members adapted to allow air flow there through to thereby dissipate any heat generated by the device. It can be appreciated that during descent the device may generate heat. A self cooling operation
30 is preferable.

It is also preferable if the housing incorporates guides to locate the position of cable dispensed from the device.

Conveniently, the device includes a back plate mounted thereto said back plate adapted to be strapped to a back of a person to thereby secure said person to said device. A simple harness makes the device easy to carry and deploy.

5 Preferably, the braking mechanism is operatively connected to said cable dispensing assembly through an output shaft driven by the cable dispensing assembly and wherein said braking mechanism is a centrifugal braking mechanism in which said brake spinner frame having one or more braking elements attached thereto is connected to the output shaft and is rotated in response to rotation of the output shaft.

10 Preferably, the braking frame includes one or more braking elements pivotally mounted thereto, said braking elements pivoting under the influence of centrifugal force as the output shaft rotates to thereby bring the braking elements progressively into contact with a braking surface.

15 The braking mechanism may be operatively connected to said cable dispensing assembly through a geared arrangement. The use of a geared arrangement allows the device to have a more responsive braking system.

The device of the invention therefore uses the forces acting on the cable as it is paid out from the device to drive the gearing arrangement. The gearing arrangement then serves to accelerate to the speed of rotation such that the output from the gearing is then able to produce a substantial braking effect.

20 Preferably, the rotatable dispensing assembly includes a reel from which said cable is dispensed has an innermost surface serving as a ring gear of a planetary gear arrangement and the ring gear operates through a gear drives output shaft, said output shaft serving to operate said braking mechanism. The planetary gear arrangement consists of three outermost planetary gears carried on a stationary gear frame are
25 arranged around a central spinner gear and wherein the spinner gear independently engages all three planetary gears, whereby each planetary gear engages ring gear such that dispensing of cable drives the ring gear which, in turn drives the planetary gears and thus the spinner gear.

30 Preferably, the spinner gear is secured for rotation on a spinner gear shaft, and whereby the spinner gear shaft is also connected to the braking mechanism such that a speed of rotation of the spinner gear and thereby the is proportional to a speed of rotation of the ring and thus the a braking response of the braking mechanism is

proportional to the rate at which cable is dispensed from the cable dispensing assembly.

5 Preferably, the cable is adapted to be connected at a free end thereof to a launch arm attached to a building. A launch arm may consist of a channel member having a track therein adapted to hold a runner attached to a free end of the cable. By attaching the device to a building in this way the user is able to position themselves clear on any obstructions on the descent.

10 Preferably, the launch arm is movable between a retracted position in which the channel is inoperative and an extended condition in which the launch arm is available for use. A safety flap serving to restrict access to said channel in the retracted position and said safety flap being released as said channel is moved to an extended position.

DESCRIPTION OF DRAWINGS

15 The above and other objects, features, and advantages of the present invention will be apparent from the following detailed description of a preferred embodiment in conjunction with the accompanying drawings. In the drawings:

Figure 1 illustrates an escape device in accordance with the present invention;

Figure 2 illustrates a perspective view of the escape device of figure 1;

Figure 3 shows a rear view of the full assembly of the device of figure 1;

Figure 4 illustrates an cross sectional side view of the assembly of figure 1;

20 Figure 5 shows a rear face view of a back plate used in the assembly of the device of figure 1;

Figure 6 shows a side view of a back plate used in the assembly of the device of figure 1;

25 Figure 7 shows a perspective view of a back plate used in the assembly of the device of figure 1;

Figure 8 illustrates a view of a main assembly of the device;

Figure 9 shows the main assembly in exploded view;

Figure 10 shows the brake drum of the main assembly in various views;

Figure 11 shows the main frame of the main assembly in perspective view;

CLAIMS

1. An escape device characterized in that it includes:
 - a cable;
 - a rotatable cable dispensing assembly from which said cable is dispensed under
5 load,
 - a braking mechanism operatively connected to said rotatable cable dispensing assembly, said braking mechanism characterised by a brake drum and a brake drum spinner frame, said brake drum spinner frame is pivotably connected to a
10 plurality of engagement surfaces, wherein at least a portion of said engagement surfaces are in contact with said brake drum at all times and at least some braking force is applied when said escape device is at rest;
 - whereby the pressure applied by said engagement surfaces on the brake drum and the total area of each engagement surface in contact the brake drum increases as the rotation of said brake drum spinner frame increases, wherein a braking
15 response of the braking mechanism is proportional to the rate at which cable is dispensed from the rotatable cable dispensing assembly.
2. An escape device according to claim 1, characterized in that said device includes an outer housing having said cable dispensing assembly and said braking mechanism located therein.
- 20 3. An escape device according to claim 1 or claim 2, characterized in that said device includes an outer housing and wherein said housing includes cooling leaf members adapted to allow air flow there through to thereby dissipate any heat generated by said device.
4. An escape device according to any one the preceding claims, characterized in that
25 said device includes an outer housing having guides to locate the position of cable dispensed from said device.
5. An escape device according to any one of the preceding claims characterized in that said device includes a back plate mounted thereto said back plate adapted to be strapped to a back of a person to thereby secure said person to said device.

- 5 6. An escape device according to any one the preceding claims, characterized in that the braking mechanism is operatively connected to said cable dispensing assembly through an output shaft driven by the cable dispensing assembly and wherein said braking mechanism is a centrifugal braking mechanism in which said brake spinner frame having one or more braking elements attached thereto is connected to the output shaft and is rotated in response to rotation of the output shaft
- 10 7. An escape device according to claim 6, characterized in that said braking frame includes one or more braking elements pivotally mounted thereto, said braking elements pivoting under the influence of centrifugal force as the output shaft rotates to thereby bring the braking elements progressively into contact with a braking surface.
8. An escape device according to anyone of the preceding claims, characterized in that said braking mechanism is operatively connected to said cable dispensing assembly through a geared arrangement.
- 15 9. An escape device according to anyone of the preceding claims, characterized in that said rotatable dispensing assembly includes a reel from which said cable is dispensed, said reel having an innermost surface serving as a ring gear of a planetary gear arrangement and wherein said ring gear operates through a gear drives an output shaft, said output shaft serving to operate said braking mechanism.
- 20 10. A device according to claim 9, characterized in that said planetary gear arrangement consists of three outermost planetary gears carried on a stationary gear frame are arranged around a central spinner gear and wherein the spinner gear independently engages all three planetary gears, whereby each planetary gear engages ring gear such that dispensing of cable drives the ring gear which, in turn drives the planetary gears and thus the spinner gear.
- 25 11. A device according to claim 10, characterized in that said spinner gear is secured for rotation on a spinner gear shaft, and whereby the spinner gear shaft is also connected to the braking mechanism such that a speed of rotation of the spinner gear and thereby the speed of rotation of the planetary gears is proportional to a speed of rotation of the ring and thus the braking response of the braking mechanism is proportional to the rate at which cable is dispensed from the cable dispensing assembly.
- 30

12. An escape device according to any one of the preceding claims, characterized in that said cable is adapted to be connected at a free end thereof to a launch arm attached to a building.
- 5 13. An escape device according to claim 12, characterized in that said launch arm consists of a channel member having a track therein adapted to hold a runner attached to a free end of the cable.
- 10 14. An escape device according to claim 13, characterized in that said launch arm is movable between a retracted position in which the channel is inoperative and an extended condition in which the launch arm is available for use a safety flap serving to restrict access to said channel in the retracted position and said safety flap being released as said channel is moved to an extended position.